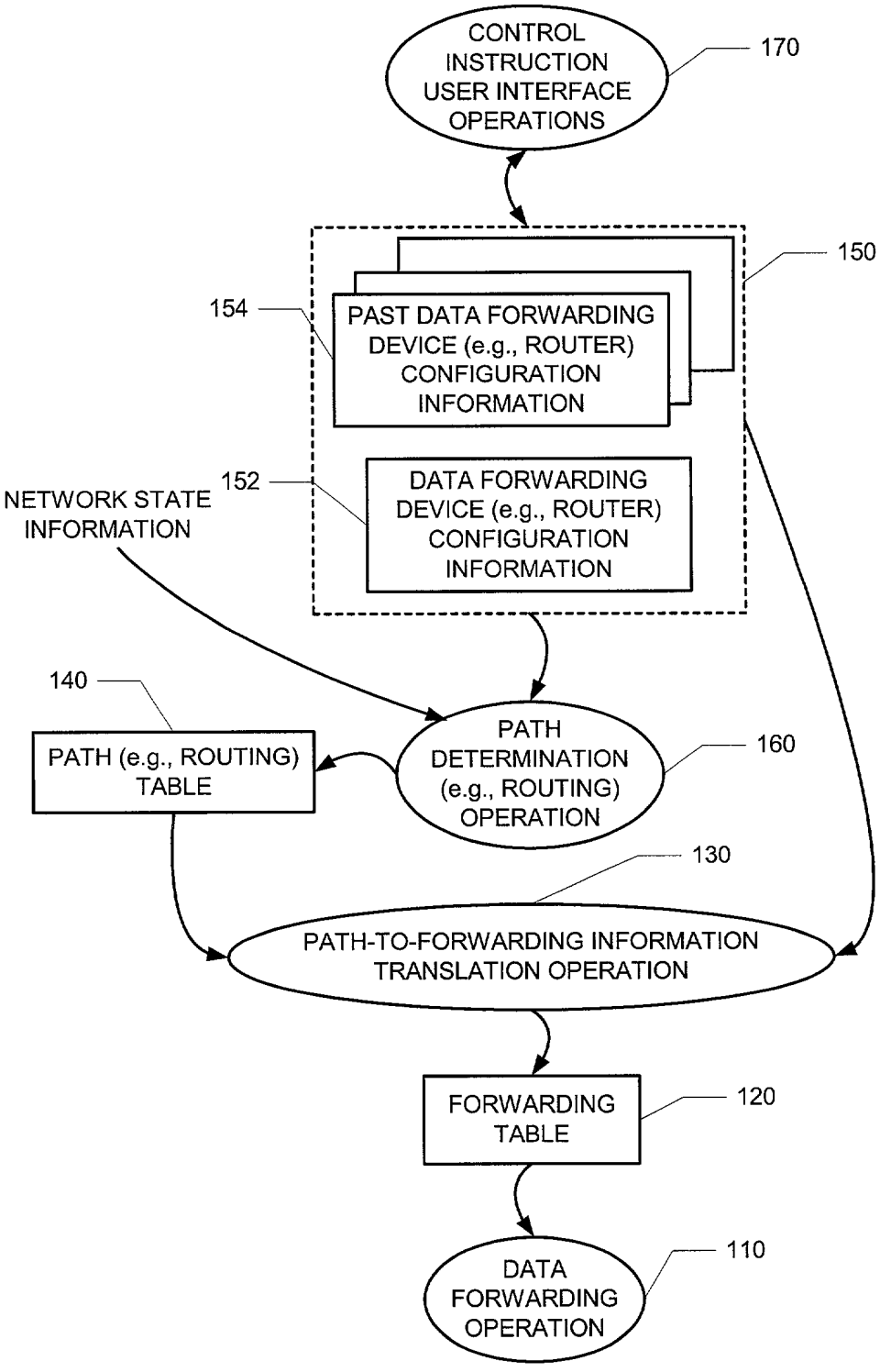

CONTROL INSTRUCTION USER INTERFACE OPERATIONS
170
150
154
PAST DATA FORWARDING DEVICE (e.g., ROUTER) CONFIGURATION INFORMATION
152
DATA FORWARDING DEVICE (e.g., ROUTER) CONFIGURATION INFORMATION
NETWORK STATE INFORMATION
140
PATH (e.g., ROUTING) TABLE
PATH DETERMINATION (e.g., ROUTING) OPERATION
160
130
PATH-TO-FORWARDING INFORMATION TRANSLATION OPERATION
FORWARDING TABLE
120
DATA FORWARDING OPERATION
110
100

FIGURE 1

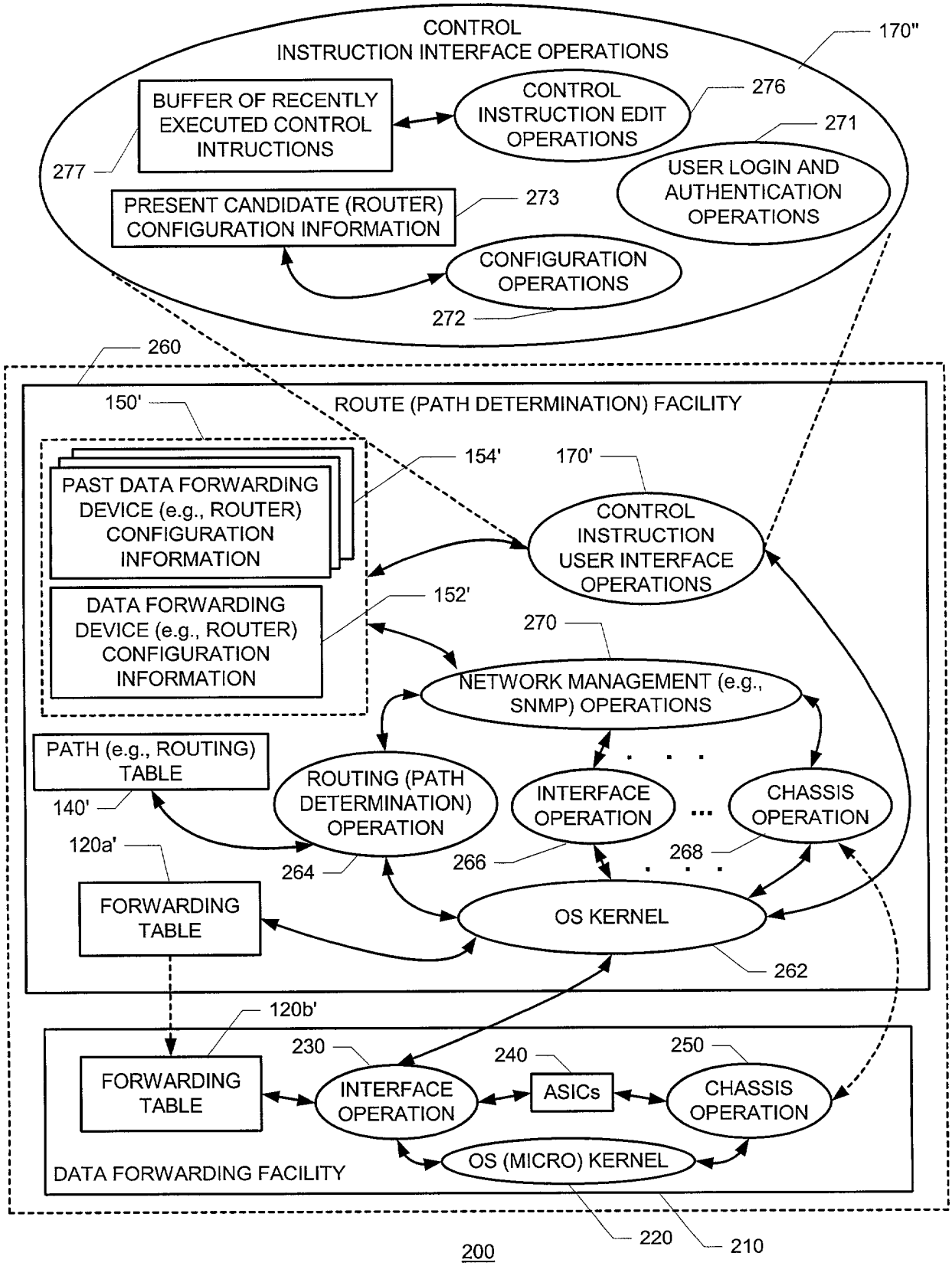

CONTROL
INSTRUCTION INTERFACE OPERATIONS
170"
BUFFER OF RECENTLY EXECUTED CONTROL INTRUCTIONS
277
CONTROL INSTRUCTION EDIT OPERATIONS
276
271
USER LOGIN AND AUTHENTICATION OPERATIONS
PRESENT CANDIDATE (ROUTER) CONFIGURATION INFORMATION
273
CONFIGURATION OPERATIONS
272
260
150'
ROUTE (PATH DETERMINATION) FACILITY
154'
170'
PAST DATA FORWARDING DEVICE (e.g., ROUTER) CONFIGURATION INFORMATION
CONTROL INSTRUCTION USER INTERFACE OPERATIONS
152'
DATA FORWARDING DEVICE (e.g., ROUTER) CONFIGURATION INFORMATION
270
NETWORK MANAGEMENT (e.g., SNMP) OPERATIONS
PATH (e.g., ROUTING) TABLE
140'
ROUTING (PATH DETERMINATION) OPERATION
INTERFACE OPERATION
CHASSIS OPERATION
120a'
264
266
268
FORWARDING TABLE
OS KERNEL
262
120b'
230
240
250
FORWARDING TABLE
INTERFACE OPERATION
ASICs
CHASSIS OPERATION
OS (MICRO) KERNEL
DATA FORWARDING FACILITY
220
210
200

FIGURE 2

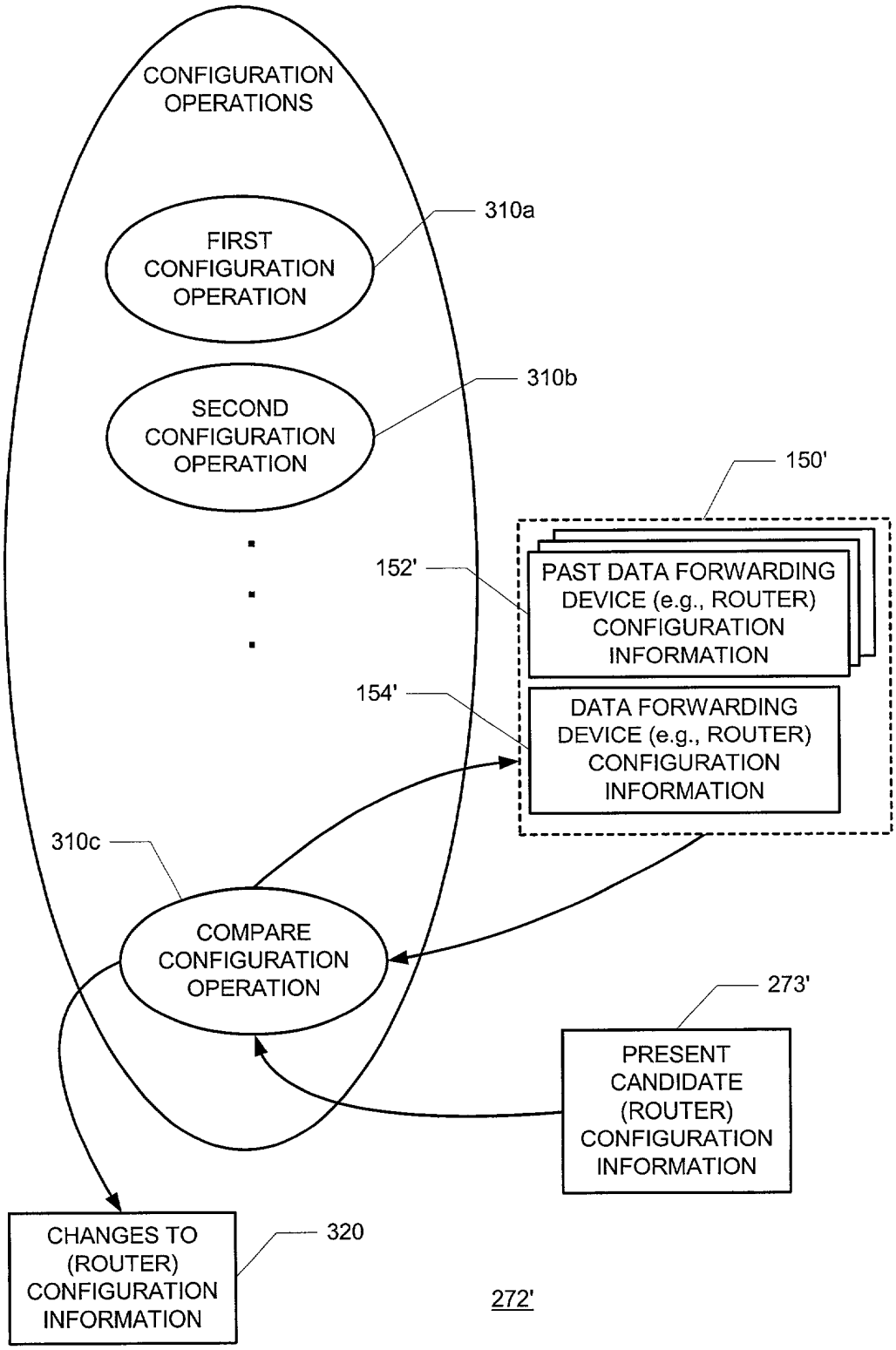

CONFIGURATION OPERATIONS
FIRST CONFIGURATION OPERATION
310a
SECOND CONFIGURATION OPERATION
310b
150'
152'
PAST DATA FORWARDING DEVICE (e.g., ROUTER) CONFIGURATION INFORMATION
154'
DATA FORWARDING DEVICE (e.g., ROUTER) CONFIGURATION INFORMATION
310c
COMPARE CONFIGURATION OPERATION
273'
PRESENT CANDIDATE (ROUTER) CONFIGURATION INFORMATION
CHANGES TO (ROUTER) CONFIGURATION INFORMATION
320
272'

FIGURE 3

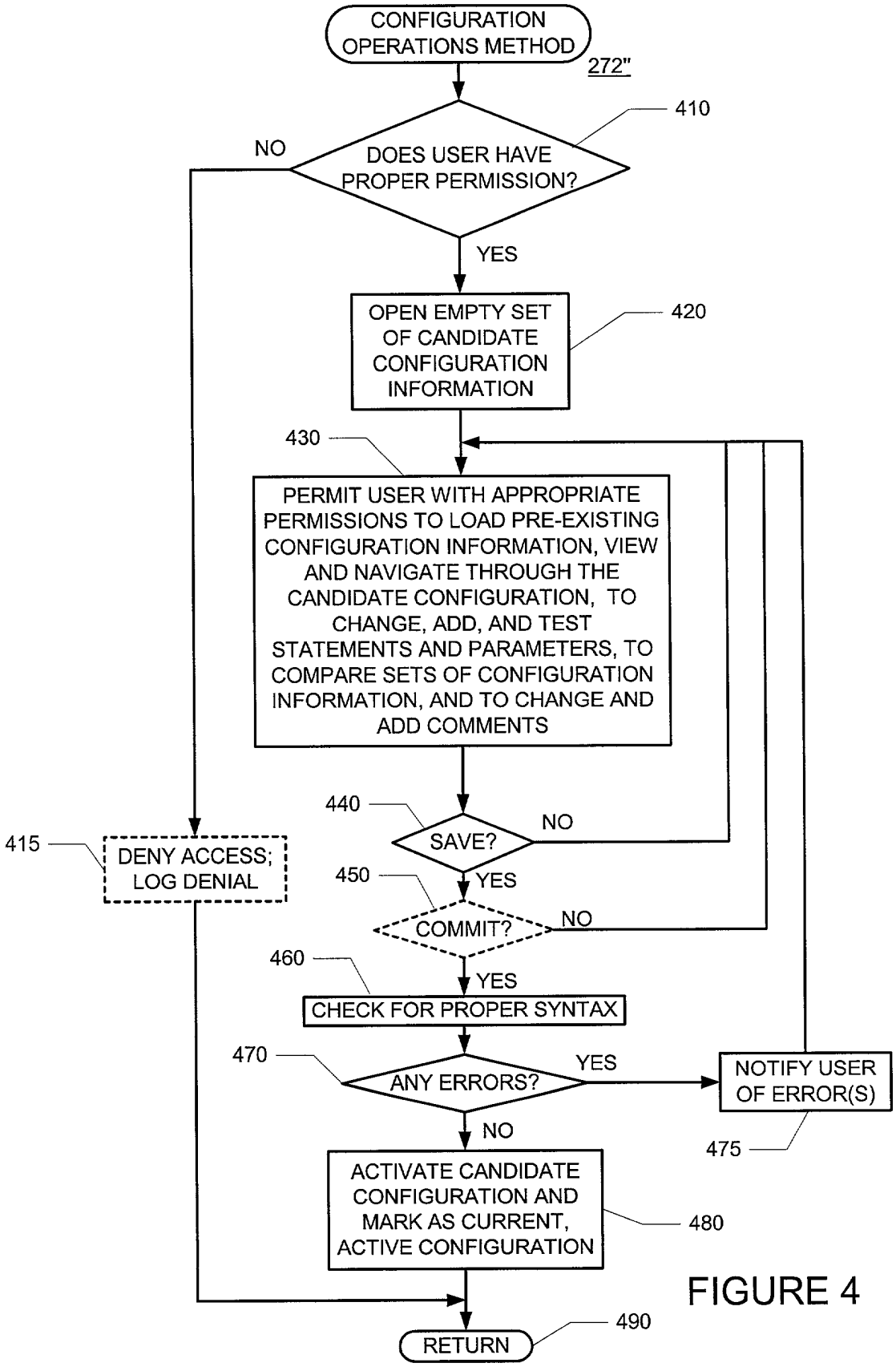

CONFIGURATION OPERATIONS METHOD
272"
410
DOES USER HAVE PROPER PERMISSION?
NO
YES
OPEN EMPTY SET OF CANDIDATE CONFIGURATION INFORMATION
420
430
PERMIT USER WITH APPROPRIATE PERMISSIONS TO LOAD PRE-EXISTING CONFIGURATION INFORMATION, VIEW AND NAVIGATE THROUGH THE CANDIDATE CONFIGURATION, TO CHANGE, ADD, AND TEST STATEMENTS AND PARAMETERS, TO COMPARE SETS OF CONFIGURATION INFORMATION, AND TO CHANGE AND ADD COMMENTS
440
SAVE?
NO
YES
415
DENY ACCESS; LOG DENIAL
450
COMMIT?
NO
YES
460
CHECK FOR PROPER SYNTAX
470
ANY ERRORS?
YES
NOTIFY USER OF ERROR(S)
475
NO
ACTIVATE CANDIDATE CONFIGURATION AND MARK AS CURRENT, ACTIVE CONFIGURATION
480
RETURN
490

FIGURE 4

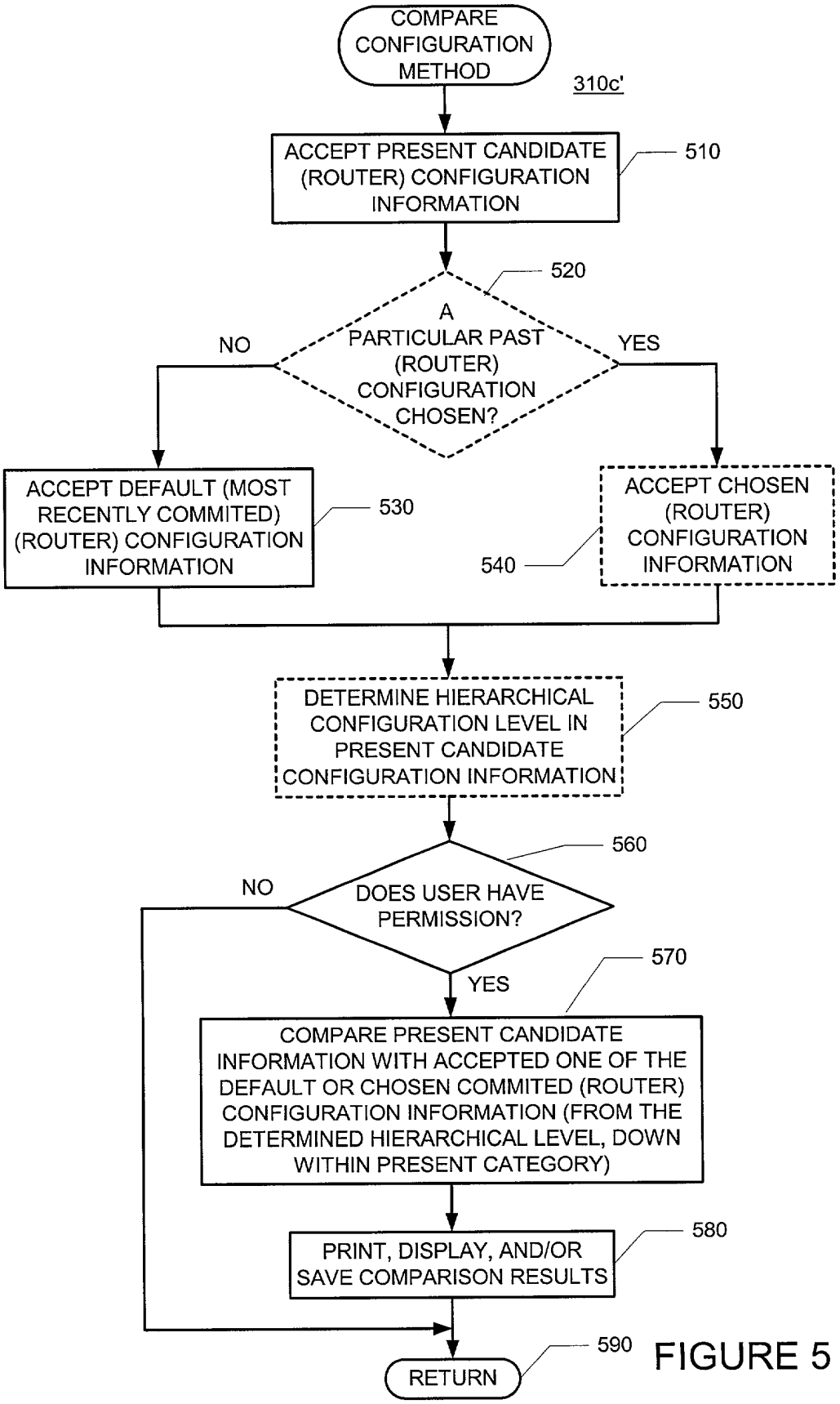
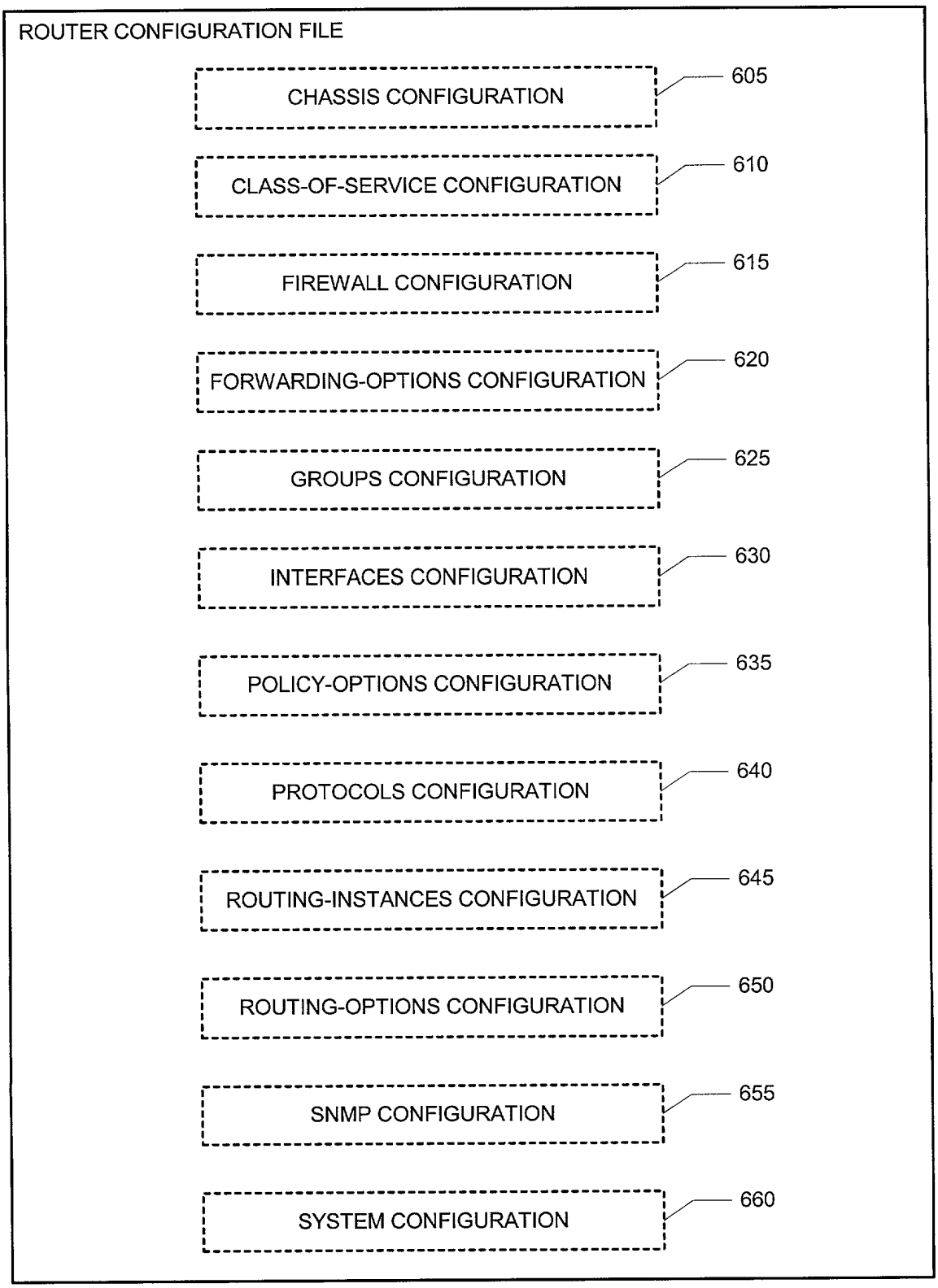

COMPARE CONFIGURATION METHOD
310c'
ACCEPT PRESENT CANDIDATE (ROUTER) CONFIGURATION INFORMATION
510
520
A PARTICULAR PAST (ROUTER) CONFIGURATION CHOSEN?
NO
YES
ACCEPT DEFAULT (MOST RECENTLY COMMITED) (ROUTER) CONFIGURATION INFORMATION
530
ACCEPT CHOSEN (ROUTER) CONFIGURATION INFORMATION
540
DETERMINE HIERARCHICAL CONFIGURATION LEVEL IN PRESENT CANDIDATE CONFIGURATION INFORMATION
550
560
DOES USER HAVE PERMISSION?
NO
YES
570
COMPARE PRESENT CANDIDATE INFORMATION WITH ACCEPTED ONE OF THE DEFAULT OR CHOSEN COMMITED (ROUTER) CONFIGURATION INFORMATION (FROM THE DETERMINED HIERARCHICAL LEVEL, DOWN WITHIN PRESENT CATEGORY)
PRINT, DISPLAY, AND/OR SAVE COMPARISON RESULTS
580
RETURN
590

FIGURE 5


ROUTER CONFIGURATION FILE
CHASSIS CONFIGURATION
605
CLASS-OF-SERVICE CONFIGURATION
610
FIREWALL CONFIGURATION
615
FORWARDING-OPTIONS CONFIGURATION
620
GROUPS CONFIGURATION
625
INTERFACES CONFIGURATION
630
POLICY-OPTIONS CONFIGURATION
635
PROTOCOLS CONFIGURATION
640
ROUTING-INSTANCES CONFIGURATION
645
ROUTING-OPTIONS CONFIGURATION
650
SNMP CONFIGURATION
655
SYSTEM CONFIGURATION
660

152"

FIGURE 6

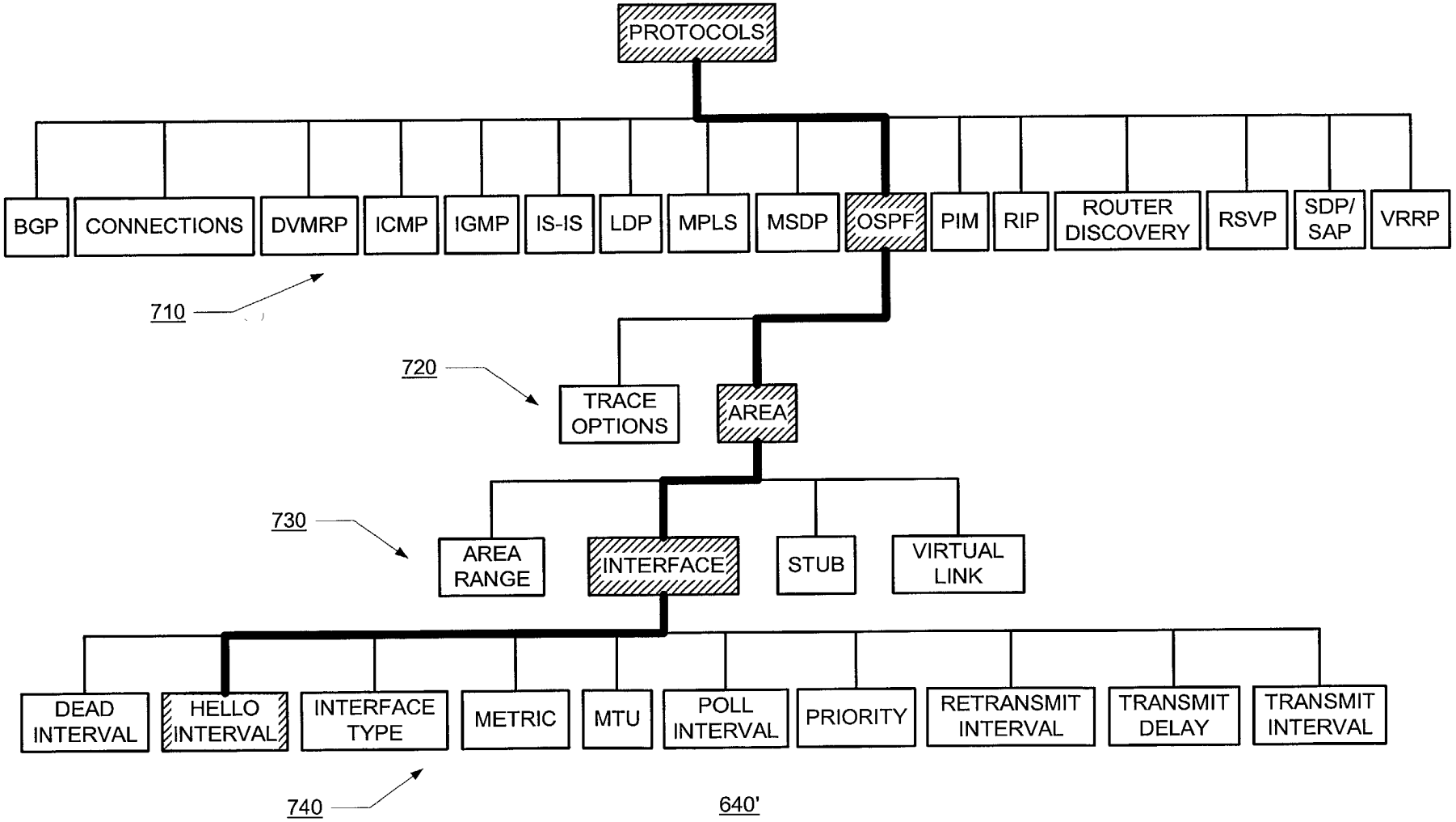

PROTOCOLS
BGP
CONNECTIONS
DVMRP
ICMP
IGMP
IS-IS
LDP
MPLS
MSDP
OSPF
PIM
RIP
ROUTER DISCOVERY
RSVP
SDP/ SAP
VRRP
710
720
TRACE OPTIONS
AREA
730
AREA RANGE
INTERFACE
STUB
VIRTUAL LINK
DEAD INTERVAL
HELLO INTERVAL
INTERFACE TYPE
METRIC
MTU
POLL INTERVAL
PRIORITY
RETRANSMIT INTERVAL
TRANSMIT DELAY
TRANSMIT INTERVAL
740
640'

FIGURE 7

[edit chassis] Hierarchy Level

```
chassis {
    alarm {
        interface-type {
            alarm-name (red | yellow | ignore);
        }
    }
    filter-check days;
    fpc slot-number {
        pic pic-number {
            framing (sdh | sonet);
            no-concatenate;
        }
    }
    (no-source-route | source-route);
    redundancy {
        routing-engine slot-number (master | backup | disabled );
        ssb slot-number (always | preferred);
    }
}  # End of [edit chassis] hierarchy level
```

FIGURE 8

[edit class-of-service] Hierarchy Level

```
class-of-service {
  input {
    fpc fpc-number {
      precedence-map map-name;
    }
    interfaces {
      interface-name {
        inet-precedence-map;
        mpls-cos-map;
        unit unit-number {
          output-queue queue-number;
        }
      }
    }
    precedence-map map-name {
      bits precedence-bit output-queue queue-number;
    }
  }
  output {
    drop-profile profile-name {
      stream-profile {
        fill-level fill-percentage drop-probability probability-percentage;
      }
      plp-set-queue-profile {
        fill-level fill-percentage drop-probability probability-percentage;
      }
      plp-clear-queue-profile {
        fill-level fill-percentage drop-probability probability-percentage;
      }
    }
    fpc fpc-number {
      drop-profile profile-name;
    }
    interfaces {
      interface-name {
        transmit-queues {
          output-queue queue-number bandwidth percentage;
        }
        weighted-round-robin {
          output-queue queue-number weight percentage;
        }
        unit unit-number {
          precedence-rewrite {
            output-queue queue-number {
              plp-clear rewrite-bits precedence-bit;
              plp-set rewrite-bits precedence-bit;
            }
          }
        }
      }
    }
  }
  policy {
    class class-name {
      classification-override {
        output-queue queue-number;
      }
    }
  }
} # End of [edit class-of-service] hierarchy level
```

FIGURE 9

[edit firewall] Hierarchy Level

```
firewall {
    filter filter-name {
        term term-name {
            from {
                match-conditions;
            }
            then {
                action;
                action-modifiers;
            }
        }
    }
}  # End of [edit firewall] hierarchy level
```

FIGURE 10

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[edit forwarding-options] Hierarchy Level

```
forwarding-options {
    sampling {
        disable;
        input {
            family inet {
                rate number;
                run-length number;
            }
        }
        output {
            cflowd hostname {
                engine-id idnumber;
                (local-dump | no-local-dump);
                port portnumber;
                version format;
            }
            file {
                filename filename;
                files number;
                size bytes;
                (stamp | no-stamp);
                (world-readable | no-world-readable);
            }
        }
        traceoptions {
            file filename {
                files number;
                size bytes;
                (world-readable | no-world-readable);
            }
        }
    }
} #End of [edit forwarding-options] hierarchy level
```

FIGURE 11

[edit groups] Hierarchy Level

```
groups {
    group-name {
        configuration-data;
    }
} #End of [edit groups] hierarchy level
```

FIGURE 12

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[edit interfaces] Hierarchy Level

```
interfaces {
    traceoptions {
        file filename <size size> <files number>;
    }
    interface-name {
        disable;
        atm-options {
            vpi vpi-identifier max-vcs vcs-value;
            ilmi;
        }
        clocking clock-source;
        dce;
        description text;
        e1-options {
            fcs (32 | 16);
            framing (g704 | unframed);
            idle-cycle-flag (flags | ones);
            loopback (local | remote);
            start-end-flag (shared | filler);
            timeslots slot-number;
        }
        e3-options {
            bert-algorithm algorithm;
            bert-error-rate rate;
            bert-period seconds;
            compatibility-mode (digital-link | kentrox);
            fcs (32 | 16);
            idle-cycle-flag value;
            loopback (local | remote);
            (payload-scrambler | no-payload-scrambler);
            start-end-flag value;
        }
        encapsulation type;
        fastether-options {
            (loopback | no-loopback);
            source-address-filter {
                mac-address;
            }
            (source-filtering | no-source-filtering);
        }
        gigether-options {
            flow-control;
            (loopback | no-loopback);
            source-address-filter {
                mac-address;
            }
            (source-filtering | no-source-filtering);
        }
        hold-time seconds;
        link-mode mode;
        mac mac-address;
        mtu bytes;
        no-keepalives;
        no-traps;
        receive-bucket {
            overflow (tag | discard);
            rate speed;
            threshold number;
        }
```

FIGURE 13a

```
sonet-options {
    aps {
        advertise-interval milliseconds;
        authentication-key key;
        force;
        hold-time milliseconds;
        lockout;
        neighbor address;
        paired-group group-name;
        protect-circuit group-name;
        request;
        revert-time seconds;
        working-circuit group-name;
    }
    bytes {
        e1-quiet value;
        f1 value;
        f2 value;
        s1 value;
        z3 value;
        z4 value;
    }
    fcs (32 | 16);
    loopback (local | remote);
    path-trace trace-string;
    (payload-scrambler | no-payload-scrambler);
    rfc-2615;
    (z0-increment | no-z0-increment);
}
speed (10m | 100m);
t1-options {
    buildout (0-133 | 133-266 | 266-399 | 399-532 | 532-655);
    byte-encoding (nx64 | nx56);
    fcs (32 | 16);
    framing (sf | esf);
    idle-cycle-flags (flags | ones);
    invert-data;
    line-encoding (ami | b8zs);
    loopback (local | remote);
    start-end-flag (shared | filler);
    timeslots slot-number;
}
t3-options {
    bert-algorithm algorithm;
    bert-error-rate rate;
    bert-period seconds;
    (cbit-parity | no-cbit-parity);
    compatibility-mode (digital-link | kentrox | larscom) <subrate value>;
    fcs (32 | 16);
    (feac-loop-respond | no-feac-loop-respond);
    idle-cycle-flag value;
    (long-buildout | no-long-buildout);
    loopback (local | remote);
    (payload-scrambler | no-payload-scrambler);
    start-end-flag value;
}
traceoptions {
    flag flag <flag-modifier> <disable>;
}
transmit-bucket {
    overflow (tag | discard);
    rate speed;
```

FIGURE 13b

```
    threshold number;
  }
  vlan-tagging;
  unit logical-unit-number {
    disable;
    dlci identifier;
    encapsulation type;
    inverse-arp;
    multicast-dlci dlci-identifier;
    multicast-vci vpi-identifier.vci-identifier;
    multipoint;
    no-traps;
    oam-liveness {
      up-count cells;
      down-count cells;
    }
    oam-period seconds;
    point-to-point;
    shaping {
      (cbr rate | vbr peak rate sustained rate burst length);
      queue-length number;
    }
    tunnel {
      source address;
      destination address;
      ttl number;
    }
    vci vpi-identifier.vci-identifier;
    vlan-id number;
    family family {
      filter {
        input filter-name;
        output filter-name;
        group filter-group-number;
      }
      mtu size;
      multicasts-only;
      no-redirects;
      primary;
      address address {
        arp ip-address mac mac-address <publish>;
        destination address;
        broadcast address;
        multipoint-destination destination-address (dlci dlci-identifier | vci vci-identifier);
        multipoint-destination destination-address {
          inverse-arp;
          oam-liveness {
            up-count cells;
            down-count cells;
          }
          oam-period seconds;
          shaping {
            (cbr rate | vbr peak rate sustained rate burst length);
            queue-length number;
          }
          vci vpi-identifier.vci-identifier;
        }
        primary;
        preferred;
```

FIGURE 13c

```
                vrrp-group group-number {
                    virtual-address [ addresses ];
                    priority number;
                    advertise-interval seconds;
                    authentication-type authentication;
                    authentication-key key;
                    (preempt | no-preempt);
                    track {
                        interface interface-name priority-cost cost;
                    }
                }
            }
        }
    }
}  # End of [edit interfaces] hierarchy level
```

FIGURE 13d

[edit policy-options] Hierarchy Level

```
policy-options {
    as-path name regular-expression;
    community name members [ community-ids ];
    damping name {
        disable;
        half-life minutes;
        max-suppress minutes;
        reuse number;
        suppress number;
    }
    policy-statement policy-name {
        term term-name {
            from {
                match-conditions;
                route-filter destination-prefix match-type <actions>;
                prefix-list name;
            }
            to {
                match-conditions;
            }
            then actions;
        }
    }
    prefix-list name {
        ip-addresses;
    }
} # End of [edit policy-options] hierarchy level
```

FIGURE 14

Exhibit 1002 - Page 0014

[edit protocols] Hierarchy Level

```
protocols {
BGP     bgp {
            advertise-inactive;
            authentication-key key;
            cluster cluster-identifier;
            damping;
            description text-description;
            disable;
            export [policy-name];
```

FIGURE 15a

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```
    family inet {
        (any | unicast | multicast) {
            prefix-limit {
                maximum number;
                teardown <percentage>;
            }
        }
    }
    hold-time seconds;
    import [policy-name];
    keep (all | none);
    local-address address;
    local-as autonomous-system <private>;
    local-preference local-preference;
    log-updown;
    metric-out metric;
    multihop <ttl-value>;
    no-aggregator-id;
    no-client-reflect;
    out-delay seconds;
    passive;
    path-selection (cisco-non-deterministic | always-compare-med);
    peer-as autonomous-system;
    preference preference;
    remove-private;
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    group group-name {
        advertise-inactive;
        allow [network/masklen];
        authentication-key key;
        cluster cluster-identifier;
        damping;
        description text-description;
        export [policy-name];
        family inet {
            (any | unicast | multicast) {
                prefix-limit {
                    maximum number;
                    teardown <percentage>;
                }
            }
        }
        hold-time seconds;
        import [policy-name];
        keep (all | none);
        local-address address;
        local-as autonomous-system <private>;
        local-preference local-preference;
        log-updown;
        metric-out metric;
        multihop <ttl-value>;
        multipath;
        no-aggregator-id;
        no-client-reflect;
        out-delay seconds;
        passive;
        peer-as autonomous-system;
```

FIGURE 15b

```
        preference preference;
        protocol protocol;
        remove-private;
        traceoptions {
          file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
          flag flag <flag-modifier> <disable>;
        }
        type type;
        neighbor address {
          advertise-inactive;
          authentication-key key;
          cluster cluster-identifier;
          damping;
          description text-description;
          export [policy-name];
          family inet {
            (any | unicast | multicast) {
              prefix-limit {
                maximum number;
                teardown <percentage>;
              }
            }
          }
          hold-time seconds;
          import policy-name;
          keep (all | none);
          local-address address;
          local-as autonomous-system <private>;
          local-preference local-preference;
          log-updown;
          metric-out metric;
          multihop <ttl-value>;
          multipath;
          no-aggregator-id;
          no-client-reflect;
          out-delay seconds;
          passive;
          peer-as autonomous-system;
          preference preference;
          protocol protocol;
          traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
              <(world-readable | no-world-readable)>;
            flag flag <flag-modifier> <disable>;
          }
        }
      }
    } # End of [edit protocols bgp] hierarchy level
```

FIGURE 15c

Connections

```
connections {
    interface-switch connection-name {
        interface interface-name.unit-number;
        interface interface-name.unit-number;
    }
    lsp-switch connection-name {
        transmit-lsp label-switched-path;
        receive-lsp label-switched-path;
    }
    remote-interface-switch connection-name {
        interface interface-name.unit-number;
        transmit-lsp label-switched-path;
        receive-lsp label-switched-path;
    }
} # End of [edit protocols connections] hierarchy level
```

DVMRP

```
dvmrp {
    disable;
    export [ policy-names ];
    import [ policy-names ];
    rib-group group-name;
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    interface interface-name {
        disable;
        hold-time seconds;
        metric metric;
    }
} # End of [edit protocols dvmrp] hierarchy level
```

IGMP

```
igmp {
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    query-interval seconds;
    query-last-member-interval seconds;
    query-response-interval seconds;
    robust-count seconds;
    interface interface-name {
        disable;
        version seconds;
    }
} # End of [edit protocols igmp] hierarchy level
```

IS-IS

```
isis {
    disable;
    authentication-key key;
    authentication-type authentication;
    export [ policy-names ];
    level level-number {
        authentication-key key;
        authentication-type authentication;
        external-preference preference;
        preference preference;
        wide-metrics-only;
    }
```

FIGURE 15d

```
        lsp-lifetime seconds;
        no-authentication-check;
        overload <timeout seconds>;
        reference-bandwidth reference-bandwidth;
        traffic-engineering {
            disable;
            shortcuts;
        }
        traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
            flag flag <flag-modifier> <disable>;
        }
        interface interface-name {
            disable;
            csnp-interval seconds;
            hello-authentication-key key;
            hello-authentication-type authentication;
            lsp-interval milliseconds;
            mesh-group (value | blocked);
            passive;
            level level-number {
                disable;
                hello-authentication-key key;
                hello-authentication-type authentication;
                hello-interval seconds;
                hold-time seconds;
                metric metric;
                passive;
                priority priority;
                te-metric metric;
            }
        }
    } # End of [edit protocols isis] hierarchy level

LDP     ldp {
        interface interface-name {
            disable;
            hello-interval seconds;
            hold-time seconds;
        }
        keepalive-interval seconds;
        keepalive-timeout seconds;
        preference preference;
        traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
            flag flag <flag-modifier> <disable>;
        }
    } # End of [edit protocols ldp] hierarchy level

MPLS    mpls {
        disable;
        no-propagate-ttl;
        admin-groups {
            group-name group-value;
        }
        log-updown {
            (syslog | no-syslog);
            (trap | no-trap);
        }
```

FIGURE 15e

```
optimize-aggressive;
path path-name {
    disable;
    address <strict | loose>;
}
statistics {
    file filename size size files number <no-stamp>;
    interval seconds;
}
traceoptions {
    file name <replace> <size size> <files number> <no-stamp>
        <(world-readable | no-world-readable)>;
    flag flag <flag-modifier> <disable>;
}
traffic-engineering (bgp | bgp-igp);
label-switched-path lsp-path-name {
    disable;
    to address;
    from address;
    adaptive;
    admin-group {
        include [ group-names ];
        exclude [ group-names ];
    }
    bandwidth bps;
    class-of-service class-of-service;
    fast-reroute {
        bandwidth bps;
        hop-limit number;
        include group-names;
        exclude group-names;
    }
    hop-limit number;
    ldp-tunneling;
    metric metric;
    no-cspf;
    no-decrement-ttl;
    optimize-timer seconds;
    preference preference;
    priority setup-priority hold-priority;
    (random | least-fill | most-fill);
    (record | no-record);
    retry-limit number;
    retry-timer seconds;
    standby;
    primary path-name {
        adaptive;
        admin-group {
            include [ group-names ];
            exclude [ group-names ];
        }
        bandwidth bps;
        class-of-service class-of-service;
        hop-limit number;
        no-cspf;
        optimize-timer seconds;
        preference preference;
        priority setup-priority hold-priority;
        (record | no-record);
        standby;
    }
```

FIGURE 15f

```
        secondary path-name {
            adaptive;
            admin-group {
                include group-names;
                exclude group-names;
            }
            bandwidth bps;
            class-of-service class-of-service;
            hop-limit number;
            no-cspf;
            optimize-timer seconds;
            preference preference;
            priority setup-priority hold-priority;
            (record | no-record);
            standby;
        }
        install {
            destination-prefix/prefix-length <active>;
        }
    }
    interface (interface-name | all) {
        disable;
        admin-group {
            group-name;
        }
        label-map in-label {
            (nexthop (address | interface-name | address/interface-name)) | (reject | discard);
            (pop | (swap <out-label>);
            class-of-service class-of-service;
            preference preference;
            type type;
        }
    }
    static-path inet {
        prefix {
            nexthop (address | interface-name | address/interface-name);
            push out-label;
            class-of-service class-of-service;
            preference preference;
        }
    }
} # End of [edit protocols mpls] hierarchy level
```

MSDP

```
msdp {
    disable;
    export [ policy-names ];
    import [ policy-names ];
    rib-group group-name;
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    peer address {
        disable;
        local-address address;
        export [ policy-names ];
        import [ policy-names ];
        traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
```

FIGURE 15g

```
            flag flag <flag-modifier> <disable>;
        }
    }
    group group-name {
        disable;
        export [ policy-names ];
        import [ policy-names ];
        local-address address;
        traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
            flag flag <flag-modifier> <disable>;
        }
        peer address; {
            disable;
            export [ policy-names ];
            import [ policy-names ];
            local-address address;
            mode <(mesh-group | standard)>;
            traceoptions {
                file name <replace> <size size> <files number> <no-stamp>
                    <(world-readable | no-world-readable)>;
                flag flag <flag-modifier> <disable>;
            }
        }
    }
} #End of [edit protocols msdp] hierarchy level

OSPF    ospf {
    disable;
    export [ policy-names ];
    external-preference preference;
    preference preference;
    reference-bandwidth reference-bandwidth;
    traffic-engineering {
        no-topology;
        shortcuts;
    }
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    area area-id {
        area-range network/masklen <restrict>;
        authentication-type authentication;
        interface interface-name {
            disable;
            authentication-key key <key-id identifier>;
            dead-interval seconds;
            hello-interval seconds;
            interface-type type;
            metric metric;
            neighbor address <eligible>;
            passive;
            poll-interval seconds;
            priority priority;
            retransmit-interval seconds;
            transit-delay seconds;
            transmit-interval seconds;
        }
```

FIGURE 15h

Juniper Exhibit 1003

```
        nssa {
            area-range network/masklen <restrict>;
            default-metric metric;
            (summaries | no-summaries);
        }
        stub <default-metric metric> <(summaries | no-summaries)>;
        virtual-link neighbor-id router-id transit-area area-id {
            disable;
            authentication-key key <key-id identifier>;
            dead-interval seconds;
            hello-interval seconds;
            retransmit-interval seconds;
            transit-delay seconds;
        }
    }
} # End of [edit protocols ospf] hierarchy level
```

PIM

```
pim {
    disable;
    dense-groups {
        addresses;
    }
    rib-group group-name;
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
    interface interface-name {
        disable;
        mode (dense | sparse | sparse-dense);
        priority number;
        version version;
    }
    rp {
        local {
            disable;
            address address;
            group-ranges {
                destination-mask;
            }
            hold-time seconds;
            priority number;
        }
        auto-rp (announce | discovery | mapping);
        bootstrap-priority number;
        static {
            address address {
                version version;
                group-ranges {
                    destination-mask;
                }
            }
        }
    }
} # End of [edit protocols pim] hierarchy level
```

RIP

```
rip {
    traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
            <(world-readable | no-world-readable)>;
```

FIGURE 15i

```
        flag flag <flag-modifier> <disable>;
      }
      authentication-key password;
      authentication-type type;
      (check-zero | no-check-zero);
      import [policy];
      message-size number;
      metric-in metric;
      receive receive-options;
      send send-options;
      group group-name {
        export [policy];
        metric-out metric;
        preference preference;
        neighbor neighbor-name {
          authentication-key password;
          authentication-type type;
          (check-zero | no-check-zero);
          import [policy];
          message-size number;
          metric-in metric;
          receive receive-options;
          send send-options;
        }
      }
    } # End of [edit protocols rip] hierarchy level
```

Router Discovery

```
    router-discovery {
      disable;
      traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
          <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
      }
      interface interface-name {
        min-advertisement-interval seconds;
        max-advertisement-interval seconds;
        lifetime seconds;
      }
      address address {
        (advertise | ignore);
        (broadcast | multicast);
        (priority priority | ineligible);
      }
    } # End of [edit protocols router-discovery] hierarchy level
```

RSVP

```
    rsvp {
      disable;
      keep-multiplier number;
      refresh-time seconds;
      traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
          <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
      }
      interface interface-name {
        disable;
        (aggregate | no-aggregate);
        authentication-key key;
        bandwidth bps;
```

FIGURE 15j

```
            hello-interval seconds;
            subscription percentage;
        }
    } # End of [edit protocols rsvp] hierarchy level

SDP/SAP     sap {
        disable;
        listen <address> <port port>;
    } # End of [edit protocols sap] hierarchy level

VRRP        traceoptions {
        flag flag;
    } # End of [edit protocols vrrp] hierarchy level

} # End of [edit protocols] hierarchy level
```

FIGURE 15k

[edit routing-instances] Hierarchy Level

```
[edit]
routing-instances routing-instance-name {
    interface interface-name;
    protocols {
        ospf {
            ospf-configuration;
        }
    }
    routing-options {
        aggregate {
            defaults {
                (active | passive);
                as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
                    <aggregator as-number in-address>;
                community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
                (full | brief);
                (metric | metric2 | metric3 | metric4) value;
                (preference | preference2 | color | color2) preference;
                (tag | tag2) string;
            }
        autonomous-system autonomous-system <loops number>;
        confederation confederation-autonomous-system members autonomous-system;
        fate-sharing {
            group group-name;
            cost value;
            from address [to address];
        }
        forwarding-table {
            export [ policy-names ];
        }
        generate {
            defaults {
                (active | passive);
                as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
                    <aggregator as-number in-address>;
                community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
                (full | brief);
                (metric | metric2 | metric3 | metric4) value;
                (preference | preference2 | color | color2) preference;
                (tag | tag2) string;
            }
```

FIGURE 16a

```
interface-routes {
   rib-group routing-table-name;
}
martians {
   destination-prefix match-type <allow>;
}
multicast {
   scope scope-name {
      interface interface-name;
      prefix destination-prefix;
   }
}
options {
   syslog (level level | upto level);
}
rib routing-table {
   aggregate {
      defaults {
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
      route destination-prefix {
         policy policy-name;
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
   generate {
      defaults {
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
   martians {
      destination-prefix match-type <allow>;
   }
```

FIGURE 16b

```
    static {
        defaults {
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
                <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (install | no-install);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (readvertise | no-readvertise);
            (no-retain | retain);
            (tag | tag2) string;
        }
        route destination-prefix {
            policy policy-name];
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
                <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (full | brief);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (tag | tag2) string;
        }
    }
    rib-groups {
        group-name {
            import-rib [ group-name ];
            export-rib group-name;
        }
    }
    route-record;
    router-id address;
    static {
        defaults {
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
                <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (install | no-install);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (readvertise | no-readvertise);
            (no-retain | retain);
            (tag | tag2) string;
        }
    traceoptions {
            file name <replace> <size size> <files number> <no-stamp>
                <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
    }
}
```

FIGURE 16c

[edit routing-options] Hierarchy Level

```
routing-options {
   aggregate {
      defaults {
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
      route destination-prefix {
         policy policy-name;
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
   }
   autonomous-system autonomous-system <loops number>;
   confederation confederation-autonomous-system  members autonomous-system;
   forwarding-table {
      export [ policy-names ];
   }
   generate {
      defaults {
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
      route destination-prefix {
         policy policy-name;
         (active | passive);
         as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
         community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
         (full | brief);
         (metric | metric2 | metric3 | metric4) value;
         (preference | preference2 | color | color2) preference;
         (tag | tag2) string;
      }
   }
   interface-routes {
      rib-group routing-table-name;
   }
   martians {
      destination-prefix match-type <allow>;
   }
```

FIGURE 17a

```
multicast {
    scope scope-name {
        interface interface-name;
        prefix destination-prefix;
    }
}
options {
    syslog (level level | upto level);
}
rib routing-table {
    static {
        defaults {
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
                <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (install | no-install);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (readvertise | no-readvertise);
            (no-retain | retain);
            (tag | tag2) string;
        }
        route destination-prefix {
            next-hop;
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
                <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (install | no-install);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (readvertise | no-readvertise);
            (no-retain | retain);
            (tag | tag2) string;
        }
    aggregate {
        defaults {
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
                <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (full | brief);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (tag | tag2) string;
        }
        route destination-prefix {
            policy policy-name;
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
                <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (full | brief);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (tag | tag2) string;
        }
```

FIGURE 17b

```
        generate {
          defaults {
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
              <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (full | brief);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (tag | tag2) string;
          }
          route destination-prefix {
            policy policy-name;
            (active | passive);
            as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
              <aggregator as-number in-address>;
            community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
            (full | brief);
            (metric | metric2 | metric3 | metric4) value;
            (preference | preference2 | color | color2) preference;
            (tag | tag2) string;
          }
        }
        martians {
          destination-prefix match-type <allow>;
        }
      }
      rib-groups {
        group-name {
          import-rib [ group-name ];
          export-rib group-name;
        }
      }
      router-id address;
      static {
        defaults {
          (active | passive);
          as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
          community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
          (install | no-install);
          (metric | metric2 | metric3 | metric4) value;
          (preference | preference2 | color | color2) preference;
          (readvertise | no-readvertise);
          (no-retain | retain);
          (tag | tag2) string;
        }
        route destination-prefix {
          next-hop;
          (active | passive);
          as-path <as-path> <origin (egp | igp | incomplete | none)> <atomic-aggregate>
            <aggregator as-number in-address>;
          community ([ community-ids ] | no-advertise | no-export | no-export-subconfed | none);
          (install | no-install);
          (metric | metric2 | metric3 | metric4) value;
          (preference | preference2 | color | color2) preference;
          (readvertise | no-readvertise);
          (no-retain | retain);
          (tag | tag2) string;
        }
      }
      traceoptions {
        file name <replace> <size size> <files number> <no-stamp>
          <(world-readable | no-world-readable)>;
        flag flag <flag-modifier> <disable>;
      }
    } # End of [edit routing-options] hierarchy level
```

FIGURE 17c

[edit snmp] Hierarchy Level

```
snmp {
    description description;
    location location;
    contact contact;
    interface [ interface-names ];
    community community-name {
        authorization authorization;
        clients {
            default restrict;
            address <restrict>;
        }
    }
    trap-group group-name {
        categories category;
        targets {
            address;
        }
        version version;
    }
    traceoptions {
        file <files number> <size size>;
        flag flag <disable>;
    }
}  # End of [edit snmp] hierarchy level
```

FIGURE 18

Juniper Networks Confidential

[edit system] Hierarchy Level

```
system {
    authentication-order [ authentication-methods ];
    backup-router address <destination destination-address>;
    compress-configuration-files;
    default-address-selection;
    dhcp-relay (server address | disable);
    diag-port-authentication (encrypted-password "password" | plain-text-password);
    domain-name domain-name;
    domain-search [domain-list];
    host-name host-name;
    location {
        altitude feet;
        country-code code;
        hcoord horizontal-coordinate;
        lata service-area;
        latitude degrees;
        longitude degrees;
        npa-nxx number;
        postal-code postal-code;
        vcoord vertical-coordinate;
    }
    login {
        message text;
        class class-name {
            allow-commands "regular-expression";
            deny-commands "regular-expression";
            idle-timeout minutes;
            permissions [ permissions ];
        }
        user user-name {
            full-name complete-name;
            uid uid-value;
            class class-name;
            authentication {
                (encrypted-password "password" | plain-text-password);
                ssh-rsa "public-key";
            }
        }
    }
    name-server {
        address;
    }
    no-redirects;
    ntp {
        authentication-key key-number type type value password;
        boot-server address;
        broadcast <address> <key key-number> <version value> <ttl value>;
        broadcast-client;
        multicast-client <address>;
        peer address <key key-number> <version value> <prefer>;
        server address <key key-number> <version value> <prefer>;
        trusted-key [ key-numbers ];
    }
    ports {
        auxiliary {
            insecure;
            speed baud-rate;
            type terminal-type;
        }
        console {
            insecure;
            speed baud-rate;
            type terminal-type;
```

FIGURE 19a

```
    }
  }
  processes {
    inet-process (enable | disable);
    interface-control (enable | disable);
    mib-process (enable | disable);
    ntp (enable | disable);
    routing (enable | disable);
    snmp (enable | disable);
    watchdog (enable | disable) <timeout seconds>;
  }
  radius-server server-address {
    port number;
    retry number;
    secret password;
    timeout seconds;
  }
  root-authentication {
    (encrypted-password "password" | plain-text-password);
    ssh-rsa "public-key";
  }
  services {
    finger <connection-limit limit> <rate-limit limit>;
    ssh <connection-limit limit> <rate-limit limit>;
    telnet <connection-limit limit> <rate-limit limit>;
  }
  static-host-mapping {
    host-name {
      inet [ address ];
      sysid system-identifier;
      alias [ alias ];
    }
  }
  syslog {
    file filename {
      facility level;
      archive {
        files number;
        size size;
        (world-readable | no-world-readable);
      }
    }
    host hostname {
      facility level;
      facility-override facility;
      log-prefix string;
    }
    user (username | *) {
      facility level;
    }
    console {
      facility level;
    }
    archive {
      files number;
      size size;
      (world-readable | no-world-readable);
    }
  }
  tacplus-server server-address {
    secret password;
    single-connection;
    timeout seconds;
  }
  time-zone time-zone;
}} # End of [edit system] hierarchy level
```

FIGURE 19b

07027 h2ehE260

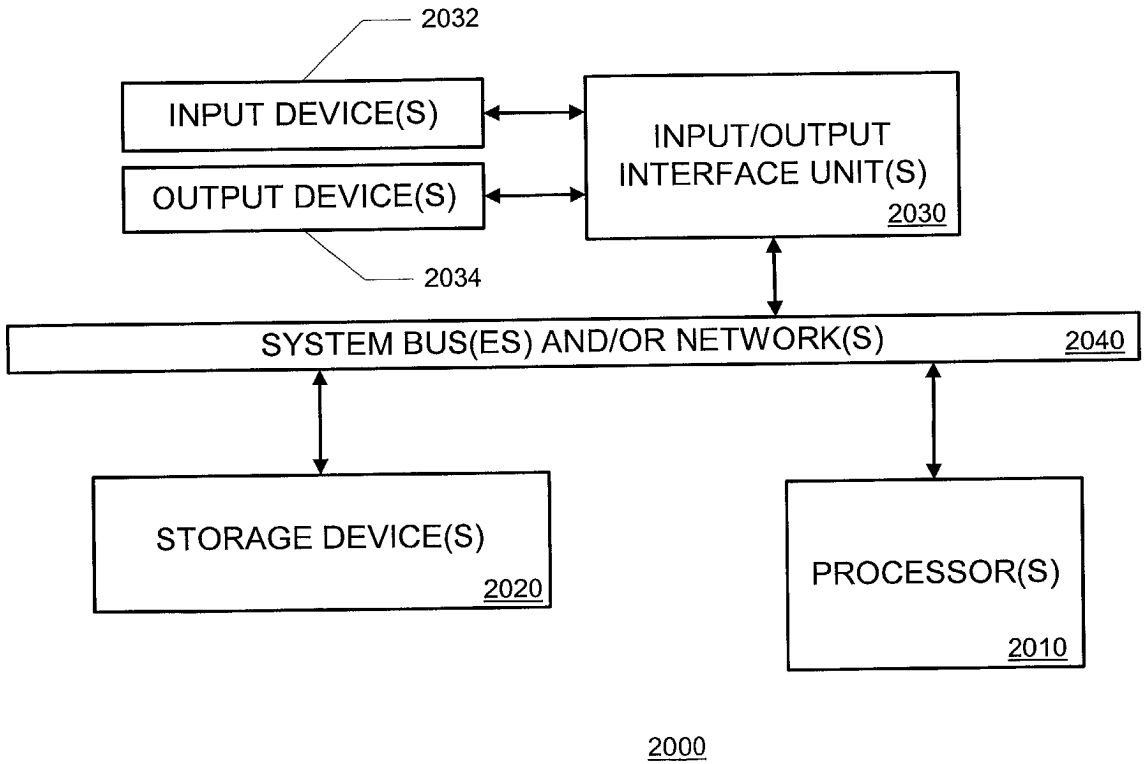

FIGURE 20